

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action Environmental Indicator (EI) RCRIS code (CA725)

Current Human Exposures Under Control

Facility Name: RAYTHEON INC.
Facility Address: Boulder, Colorado
Facility EPA ID #: COD00768646

1. Has all available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been considered in this EI determination?

☒ If yes - check here and continue with #2 below.

☐ If no - re-evaluate existing data, or

☐ if data are not available skip to #6 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

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2. Are groundwater, soil, surface water, sediments, or air media known or reasonably suspected to be "contaminated"¹ above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	Yes	No	?	Rationale/Key Contaminants
Groundwater	<u>x</u>	<u> </u>	<u> </u>	<u>TCE, DCE, vinyl chloride, freon 113, acetone</u>
Air (indoors) ²	<u>x</u>	<u>x</u>	<u> </u>	<u>NDMA.</u>
Surface Soil (e.g., <2 ft)	<u> </u>	<u>x</u>	<u> </u>	<u>No evidence</u>
Surface Water	<u>x</u>	<u> </u>	<u> </u>	<u>TCE, DCE, vinyl chloride</u>
Sediment	<u>x</u>	<u> </u>	<u> </u>	<u>TCE, DCE, vinyl chloride</u>
Subsurf. Soil (e.g., >2 ft)	<u>x</u>	<u> </u>	<u> </u>	<u>TCE, DCE, vinyl chloride, freon 113, acetone</u>
Air (outdoors)	<u> </u>	<u>x</u>	<u> </u>	<u>NDMA.</u>

 If no (for all media) - skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded.

x If yes (for any media) - continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

 If unknown (for any media) - skip to #6 and enter "IN" status code.

Rationale and Reference(s):

Clean Room Annex/Former Impoundment, Unnamed Drainage, and Off-Site Seep Area

- 1) Harlan, Casey & Associates, Inc., 1992. Remedial Investigation, Beech Aircraft Company, Boulder, Colorado Facility: Report on Preliminary Investigations and detailed Inv. Plan. (April 10, 1992; Revised July 7, 1992)
- 2) Harlan & Associates, Inc., 1995. Raytheon Aircraft CO., Boulder, Colorado Facility: Report on Confirmatory Investigations and supplemental Sampling and Analysis. (November 2, 1995).
- 3) Harlan & Associates, Inc., 2000a. Raytheon Aircraft Company, former Boulder, Colorado, Facility, Clean Room Annex/Former Impoundment Area: Report on Phase I Investigations. (January 12, 2000).

Target/Missile Fueling Area:

- 1) Harlan & Associates, Inc., 2000b. Raytheon Aircraft Company, former Boulder, Colorado, facility, Target/Missile Fueling Area: Report on Phase II Investigations. (January 12, 2000).

Footnotes:

¹ "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

² Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

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3. Are there complete pathways between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

<u>Contaminated Media</u>	<u>Potential Human Receptors (Under Current Conditions)</u>						
	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food ³
Groundwater	<u>No</u>	<u>No</u>	<u>No</u>	<u>Yes</u>			<u>No</u>
Air (indoors)	<u>No</u>	<u>Yes</u>	<u>No</u>				
Soil (surface, e.g., <2 ft)	<u>No</u>	<u>No</u>	<u>No</u>	<u>No</u>	<u>No</u>	<u>No</u>	<u>No</u>
Surface Water	<u>No</u>	<u>No</u>			<u>No</u>	<u>No</u>	<u>No</u>
Sediment	<u>No</u>	<u>No</u>			<u>No</u>	<u>No</u>	<u>No</u>
Soil (subsurface e.g., >2 ft)				<u>No</u>			<u>No</u>
Air (outdoors)	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>		

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors' spaces for Media which are not "contaminated") as identified in #2 above.
2. enter "yes" or "no" for potential "completeness" under each "Contaminated" Media -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media - Human Receptor combinations (Pathways) do not have check spaces ("___"). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

- ___ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).
- x If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.
- ___ If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code

Rationale and Reference(s):

Workers are exposed to indoor air, however all risk are in the 10⁻⁵ range or less. This is considered to be an acceptable risk at present. Additional indoor air sampling is scheduled. Construction workers could be exposed during excavation work. See #2 Reference List

³ Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

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X If no (exposures can not be reasonably expected to be significant (i.e., potentially "unacceptable") for any complete exposure pathway) - skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) - continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

If unknown (for any complete pathway) - skip to #6 and enter "IN" status code

See #3 for indoor air.

Construction workers would not be significantly exposed

Monitoring and Health & Safety plans would prevent exposure.

See #2 Reference List.

⁴ If there is any question on whether the identified exposures are “significant” (i.e., potentially “unacceptable”) consult a human health Risk Assessment specialist with appropriate education, training and experience.

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n/a

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Rationale and Reference(s):

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

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6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

 X YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the RAYTHEON facility, EPA ID # COD007068646, located at Boulder, Colorado under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

 NO - "Current Human Exposures" are NOT "Under Control."

 IN - More information is needed to make a determination.

Completed by (signature) _____ Date _____
 (print) _____
 (title) _____

Supervisor (signature) _____ Date _____
 (print) _____
 (title) _____
 (EPA Region or State) _____

Locations where References may be found:

United States Environmental Protection Agency
RCRA File Room
999 18th Street, Suite 300
Denver, Colorado 80202

Contact telephone and e-mail numbers

(name) Larry P. Diede
(phone #) 303-312-6428
(e-mail) Diede.Larry@EPAMAIL.gov

FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK